AN ECOLOGICAL CHARACTERIZATION STUDY OF THE CHENIER PLAIN COASTAL ECOSYSTEM OF LOUISIANA AND TEXAS was prepared for the National Coastal Ecosystems Team, Office of Biological Services, U.S. Fish and Wildlife Service. James G. Gosselink, Louisiana State University, was principal investigator. Funding was provided by the Office of Research and Development, U.S. Environmental Protection Agency.

Copies of Volume I (Narrative Report) FWS/OBS-78/9, Volume II (Data Source Appendix) FWS/OBS-78/10, and Volume III (Atlas) FWS/OBS-78/11, may be obtained from:

National Coastal Ecosystems Team
U.S. Fish and Wildlife Service
NASA-Slidell Computer Complex
1010 Gause Blvd.
Slidell, LA 70458

Contents of Volume III

The Biological Services Program was established within the U.S. Fish and Wildlife Service to supply scientific information and methodologies on key environmental issues that impact fish and wildlife resources and their supporting ecosystems. The mission of the program is as follows:

- To strengthen the Fish and Wildlife Service in its role as a primary source of information on national fish and wildlife resources, particularly in respect to environmental impact assessment.
- To gather, analyze, and present information that will aid decisionmakers in the identification and resolution of problems associated with major changes in land and water use.
- To provide better ecological information and evaluation for Department of the Interior development programs, such as those relating to energy development.

Information developed by the Biological Services Program is intended for use in the planning and decisionmaking process to prevent or minimize the impact of development on fish and wildlife. Research activities and technical assistance services are based on analysis of the issues, a determination of the decisionmakers involved and their information needs, and an evaluation of the state of the art to identify information gaps and determine priorities. This is a strategy that will ensure that the products produced are disseminated are timely and useful.

Projects have been initiated in the following areas: coal extraction and conversion; power plants, geothermal, mineral, and oil-shale development; water resource analysis, including stream alterations and western water allocation; coastal ecosystems and Outer Continental Shelf development; and systems inventory, including National Wetland Inventory, habitat classification and analysis, and information transfer.

The Biological Services Program consists of the Office of Biological Services in Washington, D.C., which is responsible for overall planning and management; National Teams, which provide the Program's central scientific and technical expertise and arrange for contracting biological services studies with states, universities, consulting firms, and others; Regional Staff, who provide a link to problems at the operating level; and staff at certain Fish and Wildlife Service research facilities, who conduct in-house research studies.

94°45'

94°30'

94°15'

PLATE 1A
INDEX MAP

TEXAS LEGEND

Basin Boundary

LOUISIANA LEGEND

Basin Boundary

MODIFIED FROM TEXAS DEPARTMENT OF
HIGHWAYS AND PUBLIC TRANSPORTATION
COUNTY HIGHWAY MAPS, 1976.
AND
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
OFFICE OF HIGHWAYS
PARISH HIGHWAY MAPS, 1976.

PREPARED BY CARTOGRAPHIC SECTION,
CENTER FOR WETLAND RESOURCES, LOUISIANA STATE UNIVERSITY

PREPARED FOR UNITED STATES FISH AND WILDLIFE SERVICE, AN ECOLOGICAL CHARACTERIZATION STUDY OF THE CHENIER PLAIN COASTAL ECOSYSTEM OF LOUISIANA AND TEXAS. FWS/OBS-78/11. AUGUST 1979.


94°00'
93°45'
30°00'
29°45'
29°15'
SABINE ISLAND MANAGEMENT AREA
ORANGE
WARD 7
WARD 5
PORT NECHES
GROVES
PORT ARTHUR
TEXAS
LOUISIANA
Sabine Lake
SABINE MIGRATORY WATERFOWL REFUGE
J.D. MURPHREE WILDLIFE MANAGEMENT AREA
SEA RIM
SABINE PASS
SABINE RIVER BASIN
Index Map
Texas
Louisiana
Area of Map
Chenier Plain

PLATE 2

THE PLEISTOCENE EROSIONAL SURFACE

LEGEND

- CONTACT BETWEEN PLEISTOCENE AND HOLOCENE (RECENT)
- —30— DEPTH TO PLEISTOCENE EROSIONAL SURFACE (IN FEET)
- 30-FOOT BATHYMETRIC CONTOUR
- CONJECTURE
- 1 FOOT = 0.30 METER

WILLIAM G. McINTIRE. DRAFTED 1976.
CENTER FOR WETLAND RESOURCES,
LOUISIANA STATE UNIVERSITY, BATON ROUGE.
(UNPUBLISHED).

PREPARED BY CARTOGRAPHIC SECTION,
CENTER FOR WETLAND RESOURCES, LOUISIANA STATE UNIVERSITY

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PLATE 3A

CHENIER PLAIN HABITAT GROUPS

LEGEND

- AQUATIC -permanently flooded, non-vegetated inland open water and nearshore Gulf habitats.
- WETLANDS -periodically flooded lands characterized by emergent vegetation. *See Plate 4*
- AGRICULTURE -cultivated cropland and improved pasture.
- RIDGES AND UPLAND FOREST -naturally vegetated cheniers, levees, spoil banks, Pleistocene islands, and prairie surface.
- URBAN -land areas developed for residential and industrial use.
- BASIN BOUNDARY

PREPARED FROM UNITED STATES GEOLOGICAL SURVEY 1974-75, 1:24,000 ORTHOPHOTO QUADRANGLES, ADVANCED PRINTS.
NASA HIGH ALTITUDE FALSE COLOR INFRARED PHOTOGRAPH MISSION 289 ROLL 7, 1974.

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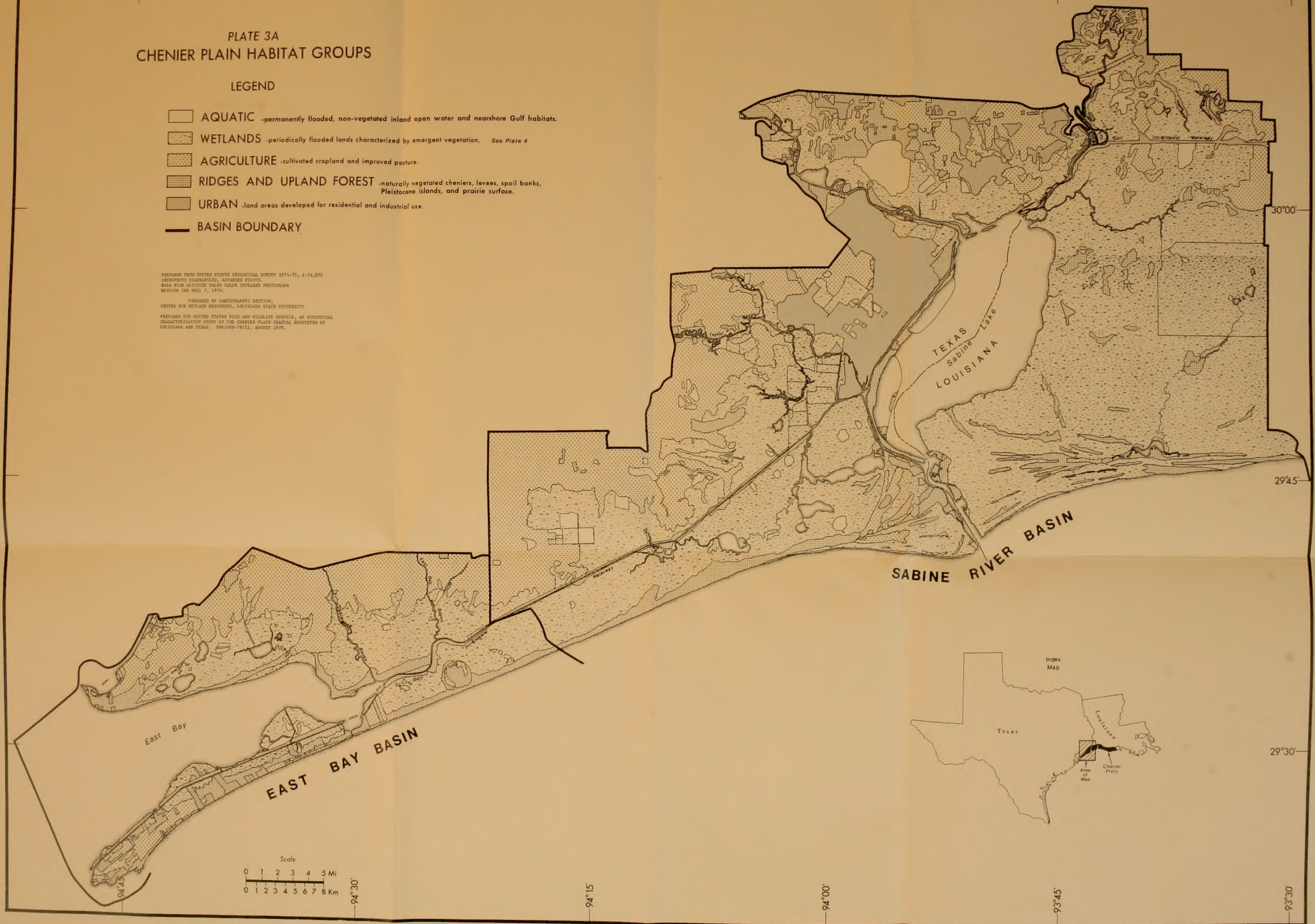

PLATE 4A

CHENIER PLAIN WETLAND HABITATS

LEGEND

- NON-WETLAND HABITATS
- SALT MARSH - saline intertidal marshes and associated small ponds, dominated by smooth cordgrass (Spartina alterniflora), with saltgrass (Distichlis spicata) and blackrush (Juncus roemerianus) common.
- BRACKISH MARSH - intertidal marshes and associated small ponds dominated by saltmeadow cordgrass (Spartina patens) and saltgrass; salinities generally less than 10 ‰
- INTERMEDIATE MARSH - marshes and associated small ponds, periodically flooded with nearly fresh water, but occassionally by brackish water. Dominated by saltmeadow cordgrass, bulltongue (Sagittaria falcata), and seashore paspalum (Paspalum vaginatum).
- FRESH MARSH - marshes flooded by fresh water, and with a diverse flora dominated by maidencane (Panicum hemitomon), bulltongue, and alligatorweed (Alternanthera philoxeroides).
- IMPOUNDED MARSH - marshes surrounded by dikes, spoil banks, or natural levees that modify normal flooding. These exist in saline to fresh areas. They may be permanently flooded or pumped dry, but all are dominated by native emergent wetland vegetation (as opposed to impounded agricultural land).
- SWAMP FOREST - forested freshwater wetlands with diverse flora dominated by baldcypress (Taxodium distichum) and tupelo (Nyssa aquatica).
- BASIN BOUNDARY

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CHABRECK, R. 1972. VEGETATION, WATER AND SOIL CHARACTERISTICS OF THE LOUISIANA COASTAL REGION LOUISIANA AGRICULTURAL EXPERIMENT STATION BULLETIN 664.

FISHER, W. L., J. H. McGOWEN, L. F. BROWN, JR., AND C. G. GROAT. 1972. ENVIRONMENTAL GEOLOGIC ATLAS OF THE TEXAS COASTAL ZONE, GALVESTON-HOUSTON AREA. BUREAU OF ECONOMIC GEOLOGY, UNIVERSITY OF TEXAS AT AUSTIN.

_____. 1973. ENVIRONMENTAL GEOLOGIC ATLAS OF THE TEXAS COASTAL ZONE, BEAUMONT-PORT ARTHUR AREA. BUREAU OF ECONOMIC GEOLOGY, UNIVERSITY OF TEXAS AT AUSTIN.

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PLATE 5A

CANALS AND POINT SOURCE DISCHARGES

LEGEND

INDUSTRIAL AND MUNICIPAL POINT SOURCE DISCHARGES

1. GULF OIL CO.-PORT ARTHUR REFINERY
2. TEXACO INC.-PORT ARTHUR PLANT
3. JEFFERSON CHEMICAL CO. INC.-PORT NECHES PLANT
4. NECHES BUTANE
5. TEXACO INC.-PORT NECHES
6. AMERIPOL INC.
7. PURE OIL CO.-BEAUMONT REFINERY
8. GULF STATES UTIL CO.-SABINE POWER STATION
9. BRITISH PETROLEUM CORP.-PORT ARTHUR REFINERY
10. JEFFERSON COUNTY-FWSDI
11. PORT ARTHUR-MAIN PLANT
12. PORT ARTHUR-LAKESIDE PARK
13. GROVES, CITY OF -SOUTH PLANT
14. GROVES, CITY OF -NORTH PLANT
15. PORT NECHES
16. JEFFERSON COUNTY WCID9-EAST PORT NECHES

CANALS

PREPARED FROM UNITED STATES GEOLOGICAL SURVEY 1974-75 1:24,000 ORTHOPHOTO QUADRANGLES, ADVANCE PRINTS; UNITED STATES GEOLOGICAL SURVEY LATEST EDITION 1:24,000 AND 1:62,500 TOPOGRAPHIC MAPS, 1974-75; UNITED STATES ARMY CORPS OF ENGINEERS 1969 UNCONTROLLED PHOTOMOSAICS LOUISIANA DEPARTMENT OF PUBLIC WORKS FIELD DATA POINT SOURCE DISCHARGES; DIENER, R.A., 1975, COOPERATIVE GULF OF MEXICO ESTUARINE INVENTORY AND STUDY -- TEXAS, AREA DESCRIPTION. U.S. DEPARTMENT OF COMMERCE, NOAA. TECH. RPT. NMFS CIRC-393, SEATTLE, WASH. 329 P.

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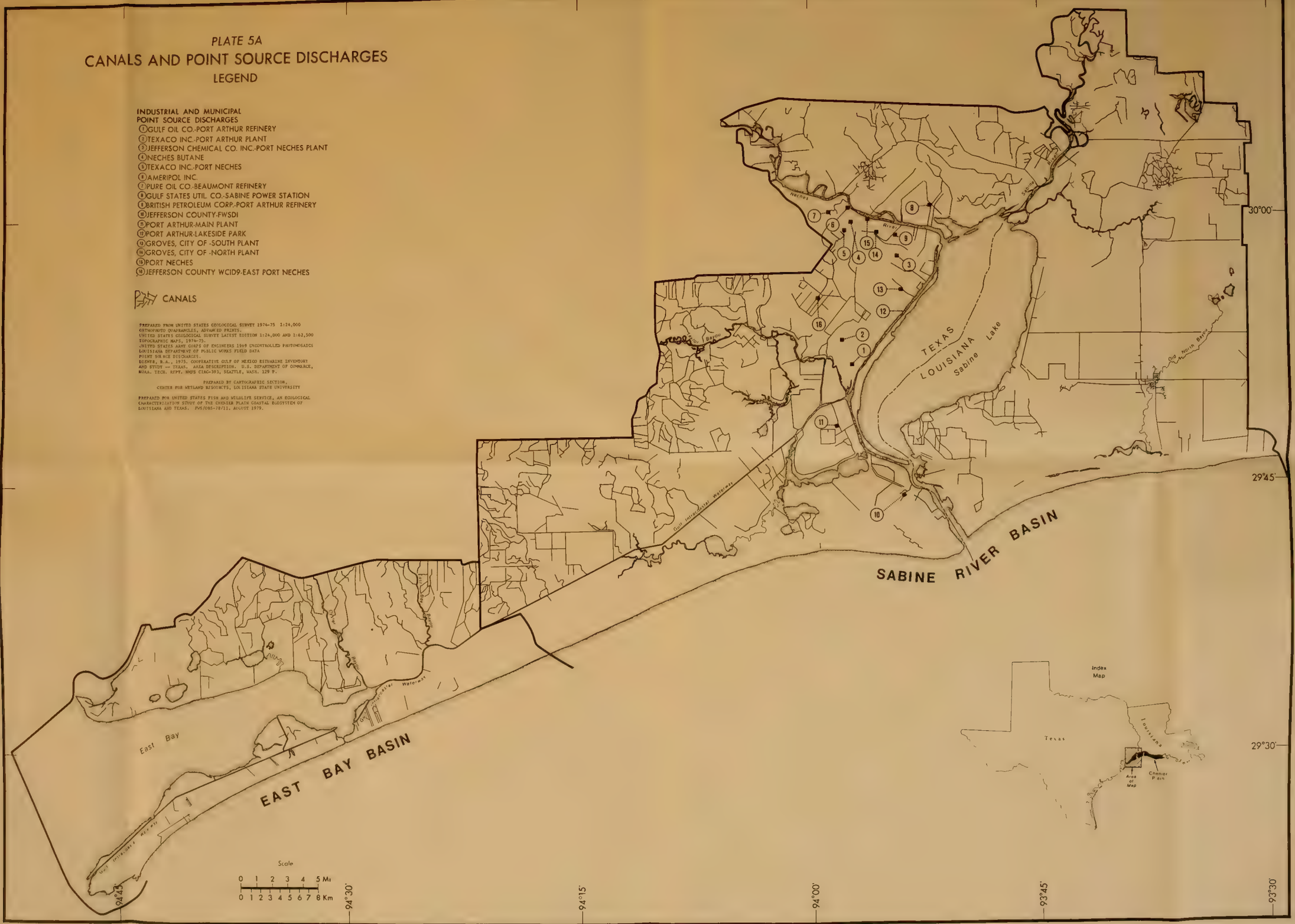


PLATE 6A
SPECIAL FEATURES
LEGEND
ARCHEOLOGICAL SITES
BIRD NESTING COLONIES
OYSTER REEFS
ARCHEOLOGICAL SITES PREPARED FROM DATA SUPPLIED BY NEWMAN, R. W., CURATOR, LOUISIANA STATE UNIVERSITY GEOSCIENCE MUSEUM. ARCHEOLOGICAL SITES IN COASTAL LOUISIANA.
SPOCK, C., TEXAS ARCHEOLOGICAL RESEARCH LABORATORY, UNIVERSITY OF TEXAS AT AUSTIN.
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FWS/OBS-78/11, AUGUST 1979
POPULATIONS OF BIRD NESTING COLONIES
COLONY
SPECIES PRESENT
1976 POPULATION (EST)
COMMON AND SCIENTIFIC NAME
ARCHEOLOGICAL SITES
SITE
DESCRIPTION
SABINE ISLAND WILDLIFE MANAGEMENT AREA
Gulf Intracoastal Waterway
Neches River
Sabine River
J.D. MURPHREE WILDLIFE MANAGEMENT AREA
SEA RIM STATE PARK
TEXAS
LOUISIANA
Sabine Lake
SABINE NATIONAL WILDLIFE REFUGE
SABINE RIVER BASIN
ANAHUAC NATIONAL WILDLIFE REFUGE
East Bay
EAST BAY BASIN
Oyster Bayou
East Bay Bayou
Scale
0 1 2 3 4 5 Mi
0 1 2 3 4 5 6 7 8 Km
Index Map
Texas
Louisiana
Area of Map
Chenier Plain
30°00'
29°45'
29°30'
94°45'
94°30'
94°15'
94°00'
93°45'
93°30'

PLATE 1B
INDEX MAP

93°30' 93°15' 93°00' 92°45' 92°30' 92°15' 92°00'

30°15'

30°00'

29°45'

29°30'

LEGEND

Basin Boundary

MODIFIED FROM TEXAS DEPARTMENT OF
HIGHWAYS AND PUBLIC TRANSPORTATION
COUNTY HIGHWAY MAPS, 1976.
AND
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
OFFICE OF HIGHWAYS
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CALCASIEU LAKE

MERMENTAU

GRAND LAKE

WHITE LAKE

CALCASIEU RIVER BASIN

MERMENTAU RIVER BASIN

CHENIER BASIN

VERMILION RIVER BASIN

Index Map

Texas

Louisiana

Chenier Plain

Area of Map

Scale

0 1 2 3 4 5 Mi

0 1 2 3 4 5 6 7 8 Km

PLATE 3B

CHENIER PLAIN HABITAT GROUPS

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- AQUATIC -permanently flooded, non-vegetated inland open water and nearshore Gulf habitats.
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Black Lake
Calcasieu Lake
Mud Lake
Gulf Intracoastal Waterway
Lake Misere
Grand Lake
Upper Mud Lake
Lower Mud Lake
White Lake
Vermilion Bay
Index Map
Louisiana
Texas
Chenier Plain
Area of Map

CALCASIEU RIVER BASIN
MERMENTAU RIVER BASIN
CHENIER BASIN
VERMILION RIVER BASIN

Scale
0 1 2 3 4 5 Mi
0 2 4 6 8 Km

30°15'
30°00'
29°45'
29°30'
93°30'
93°15'
93°00'
92°45'
92°30'
92°15'
92°00'

PLATE 4B

LEGEND

CHENIER PLAIN WETLAND HABITATS

- NON-WETLAND HABITATS
- SALT MARSH -saline intertidal marshes and associated small ponds, dominated by smooth cordgrass (Spartina alterniflora), with saltgrass (Distichlis spicata) and blackrush (Juncus roemerianus) common.
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FISHER, W. L., J. H. MCGOWEN, L. F. BROWN, JR., AND C. G. GROAT. 1972. ENVIRONMENTAL GEOLOGIC ATLAS OF THE TEXAS COASTAL ZONE, GALVESTON-HOUSTON AREA. BUREAU OF ECONOMIC GEOLOGY, UNIVERSITY OF TEXAS AT AUSTIN.

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CALCASIEU RIVER BASIN
MERMENTAU RIVER BASIN
CHENIER BASIN
VERMILION RIVER BASIN

Calcasieu Lake
Grand Lake
White Lake
Lake Misere
Gulf Intracoastal Waterway
Lower Mud Lake
Vermilion Bay

Index Map

Scale
0 1 2 3 4 5 Mi
0 2 4 6 8 Km

30°15'
30°00'
29°45'
29°30'
93°30'
93°15'
93°00'
92°45'
92°30'
92°15'
92°00'

PLATE 5B

CANALS AND POINT SOURCE DISCHARGES

LEGEND

INDUSTRIAL AND MUNICIPAL POINT SOURCE DISCHARGES

1. AMOCO PROD. CO.
2. GULF PROD. CO.
3. STEED FISH CO.
4. ZAPATA PROTEIN
5. GULF MENHADEN CO.
6. LOUISIANA MENHADEN CO.
7. HUNT OIL CO.
8. AMOCO PROD. CO.
9. TEXAS PACIFIC OIL-CRUDE PROD.
10. AMOCO PROD. CO.
11. OLIN CORP.-BRINE PROD.
12. SHELL OIL-CRUDE PROD.
13. AMOCO PROD. CO.
14. TEXACO-WELLS
15. AMOCO PROD. CO.
16. GULF OIL-WELLS
17. AMOCO PROD. CO.
18. GULF COAST ALUMINUM
19. W. R. GRACE INC.
20. PPG INDUSTRIES
21. CITIES SERVICE-POWERHOUSE
22. HERCULES INC.
23. CERTAIN-TEED INC.
24. BIG THREE IND.
25. MOBIL OIL-WELLS
26. CONTINENTAL CARBON
27. KCS RAILWAY
28. IDEAL CEMENT
29. PPG INDUSTRIES
30. DRESSER INC.
31. CONT. OIL REFINERY
32. SERVICE ICE CO.
33. OLIN CORP.
34. LAKE CHARLES-B&C
35. HOLLYWOOD
36. WEST LAKE
37. LAKE CHARLES-A
38. LOUISIANA MUD CO. INC.
39. DRESSER MAGCOBAR
40. TENNESSEE GAS PIPELINE CO
41. CONTINENTAL OIL CO.
42. AMOCO PRODUCTION CO.
43. AMOCO PRODUCTION CO.
44. TEXACO INC.
45. SEA COAST PRODUCTS
46. PHILLIPS PETROLEUM CO.
47. SHELL OIL CO.
48. SUPERIOR OIL CO.-LOWRY GAS PLANT
49. AMOCO PRODUCTION CO.

CANALS

PREPARED FROM UNITED STATES GEOLOGICAL SURVEY 1974-75 1:24,000
ORTHOPHOTO QUADS '75, ADVANCED PRINTS.
UNITED STATES TOPOGRAPHICAL SURVEY LATEST EDITION 1:24,000 AND 1:62,500
TOPOGRAPHIC MAPS, '74-'75
UNITED STATES ARMY CORPS OF ENGINEERS 1969 LANDSAT USED PHOTOMOSAICS
LOUISIANA DEPARTMENT OF PUBLIC WORKS FIELD DATA
POINT SOURCE DATA '80-'85
DIENER, R. A., ET AL. 1977. COOPERATIVE GULF OF MEXICO ESTUARINE INVENTORY AND STUDY-TEXAS AREA DESCRIPTION U.S. DEPT OF COMMERCE, NOAA/EDIS DEPT. NOS (CEP-393, SEATTLE, WASH 129 P

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ECOSYSTEM OF LOUISIANA AND TEXAS FWS/OBS-78/11 AUGUST 1979

Calcasieu Lake

MERMENTAU RIVER BASIN

CALCASIEU RIVER BASIN

CHENIER BASIN

VERMILION RIVER BASIN

Grand Lake

White Lake

Vermilion Bay

Gulf Intracoastal Waterway

Mermentau River

Calcasieu River

Index Map

Scale 0 1 2 3 4 5 Mi / 0 2 4 6 8 Km

30°15'

30°00'

29°45'

29°30'

93°30'

93°15'

93°00'

92°45'

92°30'

92°15'

92°00'

PLATE 6B
SPECIAL FEATURES

LEGEND

153 • ARCHEOLOGICAL SITES

M▲ BIRD NESTING COLONIES

OYSTER REEFS

ARCHEOLOGICAL SITES PREPARED FROM DATA SUPPLIED BY NEUMAN, R. W., CURATOR, LOUISIANA STATE UNIVERSITY GEOSCIENCE MUSEUM. ARCHEOLOGICAL SITES IN COASTAL LOUISIANA.

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FWS/OBS-78/11. AUGUST 1979.

ARCHEOLOGICAL SITES

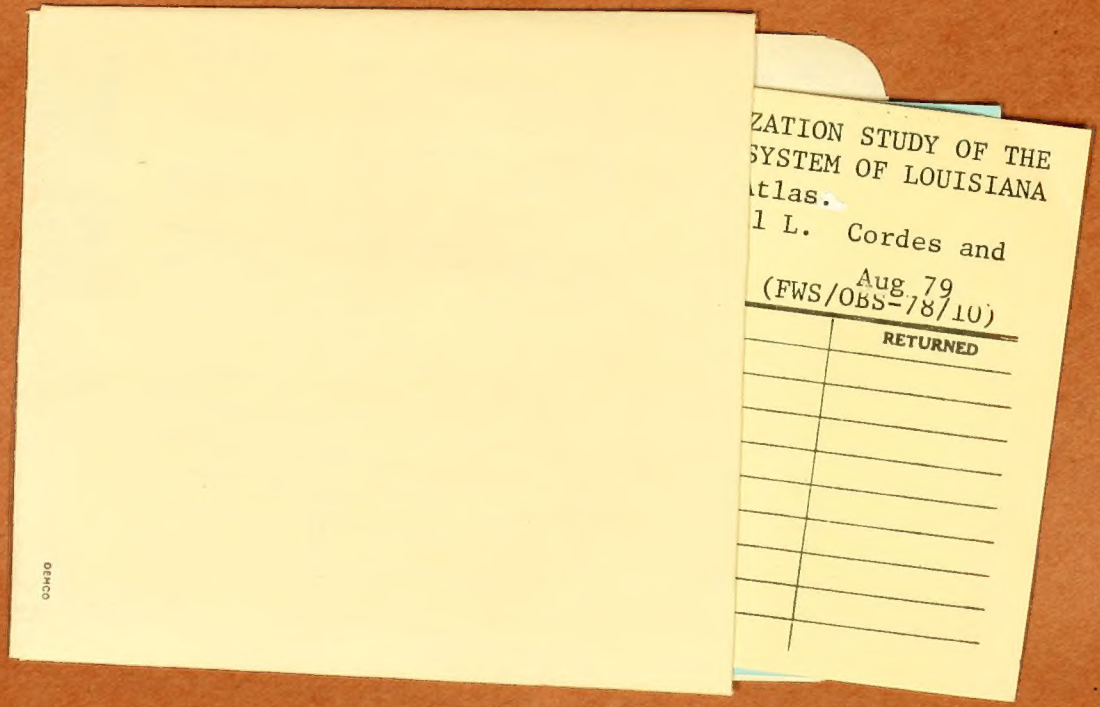
SITE	DESCRIPTION
153	Rangia midden; pottery
154	Rangia midden; pottery
155	Shell midden; pottery
156	Shell midden; pottery
157	Shell midden; pottery
158	Large shell midden; pottery
159	Shell midden; pottery
160	Rangia midden; pottery
161	Shell midden; pottery
162	Shell midden; pottery
163	Shell midden; pottery
164	Shell midden; pottery
165	Large shell midden; pottery
166	Mound; pottery
167	Shell midden
168	Rangia midden
169	Shell mound(s)
170	Shell midden
171	Shell mounds; pottery
172	Shell midden; pottery
173	Rangia midden; pottery
174	Small rangia midden; pottery
175	Large shell midden; pottery
176	Large rangia midden; pottery
177	Shell midden; pottery
178	No data
179	Small shell midden; pottery
180	Shell midden; pottery
181	Rangia midden; pottery
182	Shell midden; pottery
183	Rangia midden; pottery
184	No data
185	Rangia midden; pottery and human bone
186	No data
187	Midden
188	Mounds
189	Shell mound; pottery
190	Midden; destroyed; pottery
191	Shell midden; pottery
192	Destroyed rangia mound; pottery
193	Shell midden; large
194	Rangia midden; pottery
195	Rangia midden; pottery
196	Shell midden
197	Midden; pottery
198	Shell mounds
199	Shell mounds
200	Midden; pottery
201	Ocvina midden; pottery
202	Shell midden; bottles
203	(the) midden; bottles
204	(the) midden
205	(the) midden
206	Midden; pottery
207	Shell midden; pottery
208	Mound; destroyed; pottery, stone, bone
209	Destroyed shell mound and midden
210	Shell midden
211	Shell midden
212	Shell midden; pottery
213	Shell midden; pottery
214	Shell midden; pottery and historic Brice
215	Shell midden
216	Shell midden

POPULATIONS OF BIRD NESTING COLONIES

COLONY	SPECIES PRESENT	1979 POPULATION (EST)
L	Great blue heron	70
	Great egret	70
	Olivaceous cormorant	40
M	Great egret	100
	Little blue heron	50
	Brawny egret	500
	White-faced ibis	10
	White ibis	20
N	Anhinga	14
	Great blue heron	348
	Great egret	114
	Olivaceous cormorant	1,052
O	Black-crowned night heron	1,000
	Black skimmer	50
	Forster's tern	4,529
	Great egret	2,966
	Louisiana heron	8,158
	Snowy egret	3,484
	Unidentified	802
P	Least tern	20
Q	Least tern	100
R	Black-crowned night heron	9
	Great egret	674
	Olivaceous cormorant	230
S	Least tern	30
T	Great egret	800
	Olivaceous cormorant	300
	Roseate spoonbill	375
	Snowy egret	900
U	Louisiana heron	30
	Snowy egret	75
V	Anhinga	10
W	Anhinga	100
	Black-crowned night heron	800
	Black skimmer	600
	Cattle egret	2,000
	Forster's tern	100
	Great blue heron	110
	Great egret	1,000
	Little blue heron	200
	Louisiana heron	500
	Olivaceous cormorant	1,000
	Snowy egret	4,500
	White-faced ibis	35
	White ibis	15
X	Anhinga	10
	Black-crowned night heron	100
	Cattle egret	3,000
	Great blue heron	500
	Great egret	5,000
	Little blue heron	500
	Louisiana heron	500
	Olivaceous cormorant	4,000
	White-faced ibis &/or glossy ibis	10
	Roseate spoonbill	500
	Snowy egret	4,000
	White ibis	100
Y	Black skimmer	80
	Great egret	2,574
	Least tern	500

COMMON AND SCIENTIFIC NAME

Anhinga (*Anhinga anhinga*)
Black-crowned night heron (*Nycticorax nycticorax*)
Black skimmer (*Rynchops nigra*)
Cattle egret (*Bubulcus ibis*)
Forster's tern (*Sterna forsteri*)
Great blue heron (*Ardea herodias*)
Great egret (*Casmerodius albus*)
Little blue heron (*Florida caerulea*)
Laughing gull (*Hydrosauaia tricolor*)
Least tern (*Sterna albifrons*)
Olivaceous cormorant (*Phalacrocorax olivaceus*)
White-faced ibis (*Plegadis chihi*) and/or glossy ibis (*P. falcinellus*)
Reddish egret (*Dichromanassa rufescens*)
Roseate spoonbill (*Ajaia ajaja*)
Snowy egret (*Egretta thula*)
Unidentified
White-faced ibis (*Plegadis chihi*)
White ibis (*Endocimus albus*)
Yellow-crowned night heron (*Nyctanassa violacea*)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Biological Services Program

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August 1979

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VOLUME III

ATLAS

Interagency Energy-Environment Research and Development Program

OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
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